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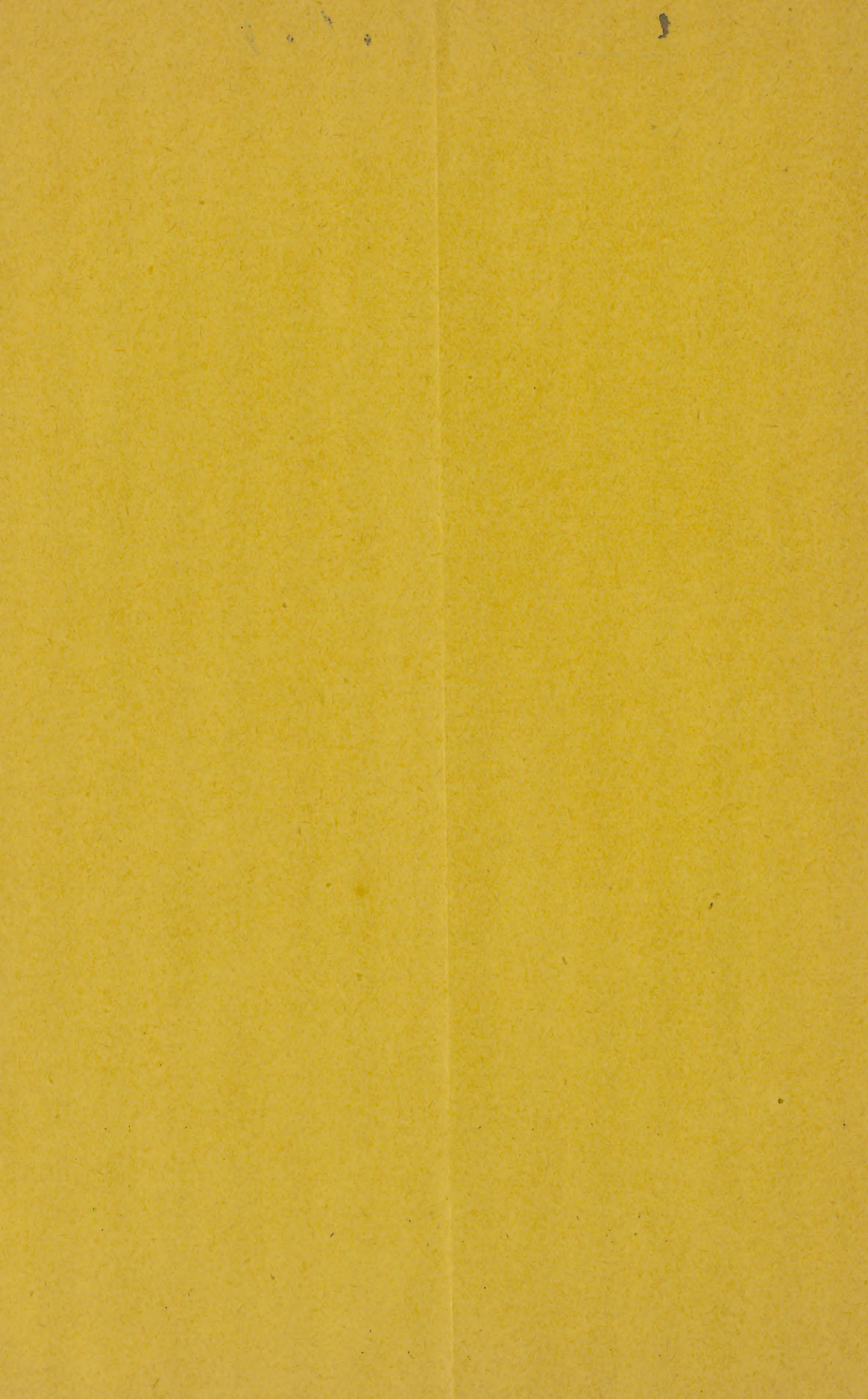
THE HALO SYMPTOM IN GLAUCOMA.

BY  
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## THE HALO SYMPTOM IN GLAUCOMA.

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HALO is classed among the prodromata of glaucoma: it may occur later in the progress of primary simple glaucoma. Some subjects of glaucoma, more observant than others, mention it without suggestion from the physician. In many instances it is not noted, or little importance is attached to it. A few attempts have been made to explain it. DeWecker thinks it "due to very slight alterations in the epithelial layer of the cornea, produced by temporary increase of pressure." Wolfe suggests that it "may be owing to dilatation of the pupil, to change in the lens, or to disturbance in the circulation." Neither "disturbance of the circulation nor dilatation of the pupil," when they exist, under other circumstances, seem to cause the phenomenon.

"Alteration in the epithelial layer of the cornea," and "change in the lens" are phrases of vague significance, the exact meaning of which may be only surmised, except that Dr. deWecker qualifies his statement by the expression "is analogous to a similar phenomenon witnessed in most cases of conjunctival catarrh where there is irregular desquamation of the epithelium." In conjunctival catarrh this peculiarity is rather due to diffraction of rays of light by globules of secretion on the surface of the cornea, as it disappears when they are removed. Moreover, cocain which disturbs the corneal epithelium *lessens* conjunctival secretion, and dilates the pupil, does not seem to produce the halo. Let it be further suggested that constant slight changes in the corneal epithelium are physiologically present *without* the phenomenon; therefore, we must look for some other explanation. Dabrowsky, of St. Petersburg (*Archiv. of Ophth.*, Vol. XV., p. 267, 1886) assumes that the glaucoma halo "depends upon irritation of the retina and optic nerve by hyperemia," in support of which he cites a personal experience while in a Russian bath. The rainbow rings became even more distinct when he entered a cooler room. He continues, "for the last few months I have constantly seen these rings around the lamplight in the evening. There is no noticeable increase of tension and the visual acuteness is  $\frac{25}{30}$ . Tension of accommodation always renders them (the rings) more





distinct. As the cause of glaucoma must be in action previous to increase of tension, or diminished acuteness of vision, and as the halo is a prodrome, Dr. Dabrowsky's eyes must rest under suspicion of inherent tendency.

The halo is never constant, but appears and disappears to recur again, and with increasing frequency as the disease develops. At one time it may be a corona; at another, it appears in the shape of varicolored *sparks* of light. This intermittence and change of form would indicate that the cause is not persistent, that at times it lacks force, or distribution. Pressure *upon* the globe will produce a ring of colored light, or a luminous spot, always opposite to the point of pressure. The halo may be present in glaucoma with seeming normal intra-ocular tension, and may be absent during increased tension; gradual, steady pressure will not produce sparks of light. The cause of the halo would seem not to be in the retina itself, but in the media anterior to it. Its variability suggests the aqueous humor, or some surface subject to the influence of the aqueous humor, for it is in the *serum* of the blood that the chief deviation from the healthy standard is perceived, products of excretion which have not been eliminated. (Garrod).

The laws of nature are undeviating; the law of gravitation, terrestrial or celestial is the same; so with the law of light. The lunar halo is a familiar object, the cause of which does not exist in ourselves nor in the moon, but in the intervening media whose character changes. The Descartes theory of the encircling lunar halo was accepted by Marriotte, Dr. Thomas Young and Sir Isaac Newton, and remains to-day the unquestioned explanation.

According to Descartes, it is owing to the refraction and reflection of rays of light by minute snow and ice crystals in the upper strata of air, and occurs in the presence of the cirrus, or ice-cloud.

Professor Cleveland Abbe explains the arrangement of colors in a circle of  $22^{\circ}$  radius, the inner edge red, the outer edge blue, to be "light polarized in direction of tangent to circumference; it is formed by light passing through the alternate faces of hexagonal ice-crystals in the direction of minimum deviation through the base and sides of right prisms."

The prevailing arrangement of colors in the glaucomatous halo is red in the outer margin and bluish-green in the inner margin, the reverse of the lunar halo. <sup>1</sup>The difference in arrangement of

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<sup>1</sup> The transposition of the colors of the halo is very strong evidence that the cause of the halo in glaucoma is to be looked for posterior to the iris, in accordance with the disposition of rays of light passing through the aperture of a screen.

colors is owing to a difference in the position of the refracting crystals relative to the eye; in one case, posterior to the pupil; in the other, external to the eye.

“Sodic chlorid + urea forms shining rhombic prisms,” (Landois & Sterling Text-book on Physiology, second Am. edition, page 432). Acid sodic urate appears as a brick-red deposit, more rarely gray or white, in rheumatic or febrile conditions. Microscopically, it is completely amorphous, consisting of granules which sometimes have spines on them. The potash salt is the same. They are easily soluble in warm water. (Vid. Suf. page 435). As the menstrua cool they are precipitated.

When the urates in the blood are in excess (uric acidemia), the same influences which determine their presence in the synovial fluid of the joints and their precipitation upon the serous surfaces operate in the eye which is more exposed to vicissitudes of temperature. Hence, variation in glaucoma halo, with variation of urates in the blood, might clearly occur without present change of intra-ocular tension.

The glaucoma halo *might* “depend upon irritation of the retina and optic nerve,” not caused by simple hyperemia, but by precipitated urates; or, it may be due to the *presence* in the aqueous, or vitreous, humor of urates in the shape of rhombic prisms or amorphous granules (with or without spines), with power to cause diffraction of light. The prisms formed by sodic chlorid + urea at least have this faculty.









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